

# *Maniola chia* - a new Satyrid from the Greek island of Chios (Lepidoptera : Nymphalidae : Satyrinae)

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**Samenvatting.** *Maniola chia* - een nieuwe Zandoog van het Griekse eiland Híos (Lepidoptera : Nymphalidae : Satyrinae)

De auteur beschrijft een nieuwe soort uit het genus *Maniola* SCHRANK van Híos. De identifikatie van het nieuwe taxon is gebaseerd op kenmerken van de uiterlijke morfologie, genitalia, morfologie van het ei, chaetotaxie van de rups en enzyme-elektroforese. Verondersteld wordt dat deze soort voornamelijk evolueerde als een gevolg van het «founder effect».

**Résumé.** *Maniola chia*- un nouveau Satyride de l'île grècque de Chios (Lepidoptera : Nymphalidae : Satyrinae)

L'auteur décrit une nouvelle espèce dans le genre *Maniola* SCHRANK provenant de Chios. Pour l'identification du nouveau taxon la morphologie externe, les genitalia, la morphologie de l'oeuf, la chaetotaxie larvaire et l'électrophorèse enzymatique sont utilisés. Il est supposé que l'espèce a évolué principalement par la suite du «founder effect».

**Abstract.** *Maniola chia* - a new Satyrid from the Greek island of Chios (Lepidoptera : Nymphalidae : Satyrinae)

A new species of the genus *Maniola* SCHRANK from Chios is described. External morphology, genitalia, embryonic morphology, larval chaetotaxy and enzyme electrophoreses were used in an identification of the new taxon. It is suggested that the species evolved principally as a result of founder effect.

**Keywords :** *chia*, *Maniola*, Chios, Satyrinae, speciation, morphology, electrophoresis.

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The butterfly fauna of the eastern Greek islands is poorly documented. The early works of REBEL (1916, 1924, 1935, 1936), TURATI (1929), TURATI & FIORI (1930), HARTIG (1940), REISSER (1946) and even the more recent papers by BENDER (1963) and BRETHERTON (1966) have been shown to be superficial in their coverage (THOMSON, 1985; RIEMIS, 1986; GASKIN & LITTLER, 1986; OLIVIER, 1986). The distribution of *Maniola telmessia* (ZELLER, 1847) and *jurtina* (LINNAEUS, 1758) in the eastern Aegean islands was known, until recently, only from some of the abovementioned lists together with the paper of TAUBER & TAUBER (1968). *Maniola telmessia* has been recorded from Karpathos, Rhodes, Symi, Kos, Kirykos, Samos and Lesbos. It was also reported from Chios by REBEL (1935) as '*Epinephele telmessia* Z. : Insel Chios, 10 und 11.VI und Insel Mytilene 13 bis 16.VI (W.W.), ein ♂, fünf ♀.' On the other Greek islands from which there are records *jurtina* is found (COUTSIS, 1969, 1972), but there are many where the situation is not known.

In May 1986 a short series of Satyrid butterflies which had been collected on the Greek island of Chios (GASKIN & LITTLER, 1986), was received from Professor David GASKIN. These had been designated *Maniola telmessia*, but

there was some doubt about their true identity. The males resembled rather large *cypricola* GRAVES (1928) or *megala* (OBERTHÜR, 1909). The females were superficially indistinguishable from the large *jurtina* phenotypes which are found in some of the eastern Mediterranean, Ionian and Aegean islands, including Crete, Corfu (THOMSON, 1969) and Zakynthos (GASKIN, pers. comm.). Dissection of both male and female genitalia revealed that the Chios butterflies were certainly not *telmessia* and, if they were to be assigned to an existing taxon, they would accord more appropriately with *Maniola jurtina*. While the form of the female genitalia suggested this affinity (THOMSON, 1976), the anomalous structure of the male genitalia in relation to known geographical variation in southern and eastern Europe (THOMSON, 1973), left considerable doubt.

Through the generous help of Mr Alain OLIVIER, 20 further individuals (10 males and 10 females) of this butterfly, collected in the Nea Moni Monastery area of the island, were received alive. Two females were subjected to photoperiod regulation in an attempt to induce oviposition. By July 12, 16 ova were laid from which 12 larvae hatched. These did not survive beyond the first instar. In preparation for enzyme electrophoresis 10 males and 9 females, including one of the laying females, were frozen.

On examination of this material it became clear that these butterflies represented an entirely new taxon. Both larval chaetotaxy and allele frequencies from electrophoretic analysis proved conclusive. Examination of a long series of Chios *Maniola* in the Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, Amsterdam, extended the morphological data and contributed to an overall picture of variation in the species.

### Description

***Maniola chia*, new species** (Lepidoptera : Nymphalidae : Satyrinae)

#### Male

Wing length : mean 23.84 mm ( $\pm 1.172$  SD), largest 26.86 mm, smallest 21.10 mm.

Upperside forewing : ground colour uniformly blackish sepia. Fulvous around ocellus usually distinct, occasionally extending as a clear submarginal band to vein 2. Apical ocellus distinct, usually moderately large or large, frequently with a single white pupil, occasionally bipupilled. Androconial band conspicuous, black, curved and tapering upwards, frequently extending beyond vein 3.

Upperside hindwing : uniformly blackish sepia.

Underside forewing : ground colour uniformly golden yellow-brown. Medial line, when present, slightly darker than ground colour. Outer margin mid grey-brown, about .1 wing length, widening towards the wing apex. Costa narrowly edged grey-brown. Apical ocellus distinct, usually single pupilled, occasionally bipupilled and surrounded indistinctly by light yellow-fulvous.

Underside hindwing : almost uniformly mid grey-brown, occasionally reddish grey-brown. Submarginal band slightly paler or indistinct. Ocelli

often large and distinct, 2 to 5 in intervenosa 2, 3, 4, 6 and 7, each surrounded by ochreous yellow, frequently white pupilled. Striae small and inconspicuous.

#### Female

Wing length : mean 25.87 mm ( $\pm 1.745$  SD), largest 28.06 mm, smallest 20.52 mm.

Upperside forewing : ground colour uniformly dark sepia, lighter than the ground colour of the male. Fulvous area extensive, always present in discal area and as a distinct but variable marginal band extending from vein 2 to vein 8. Discal and submarginal areas usually separated by a distinct, broad, dark medial line of the ground colour. Fulvous around apical ocellus paler. Apical ocellus large, frequently very large, usually distinct and with 1 or 2 white pupils.

Upperside hindwing : ground colour as forewing. Submarginal fulvous band usually clear and extensive.

Underside forewing : ground colour golden yellow-brown. Discal area paler, yellowish. Medial line inconspicuous, darker than ground colour. Outer margin grey-brown, almost .15 wing length, widening towards wing apex. Apical ocellus large, sometimes very large, distinct with 1 or 2 white pupils. Area around apical ocellus paler than the submarginal band.

Underside hindwing : ground colour variable, uniformly light grey-brown to mid sepia. Submarginal area shaded light violet-grey to fulvous, especially adjacent to the medial line. Ocelli 0 to 3. Striae conspicuous.

#### Genitalia

Male (figure 1, 1-4, figure 2, 2) : uncus long. Gnathos extending to more than .75 of the uncus length, gnathos base slightly dilated. Valve variable as with other *Maniola* species, significantly larger than *telmessia*, shaped differently from that of most *telmessia* but approximately similar to some individuals from Lesbos and Samos, distal process bluntly pointed, dorsal process (lobe) wide, less wide than in the eastern *juritina* form (THOMSON, 1973) but wider than in western *juritina*. Aedeagus broad and straight. Julien Organ thicker than that of *telmessia*, possibly slightly less so than in most eastern *juritina*. Female (figure 1, 5) : lamella postvaginalis large and broad, similar to that of *juritina*, considerably larger than that of *telmessia*. Lamella antevaginalis variable, usually heavily sclerotised. Bursa occasionally with two signa of a length greater than those of most *telmessia* but much shorter and lighter than those in *cypricola*.

#### Ovum

Similar to that of *telmessia*, but shorter (less tall) and greater in diameter than most *telmessia* ova so far examined. Rib number 13 to 14, compared with 14 to 16 for *telmessia* and more than 18 for *juritina*. Form symmetrical, unlike some *telmessia*.

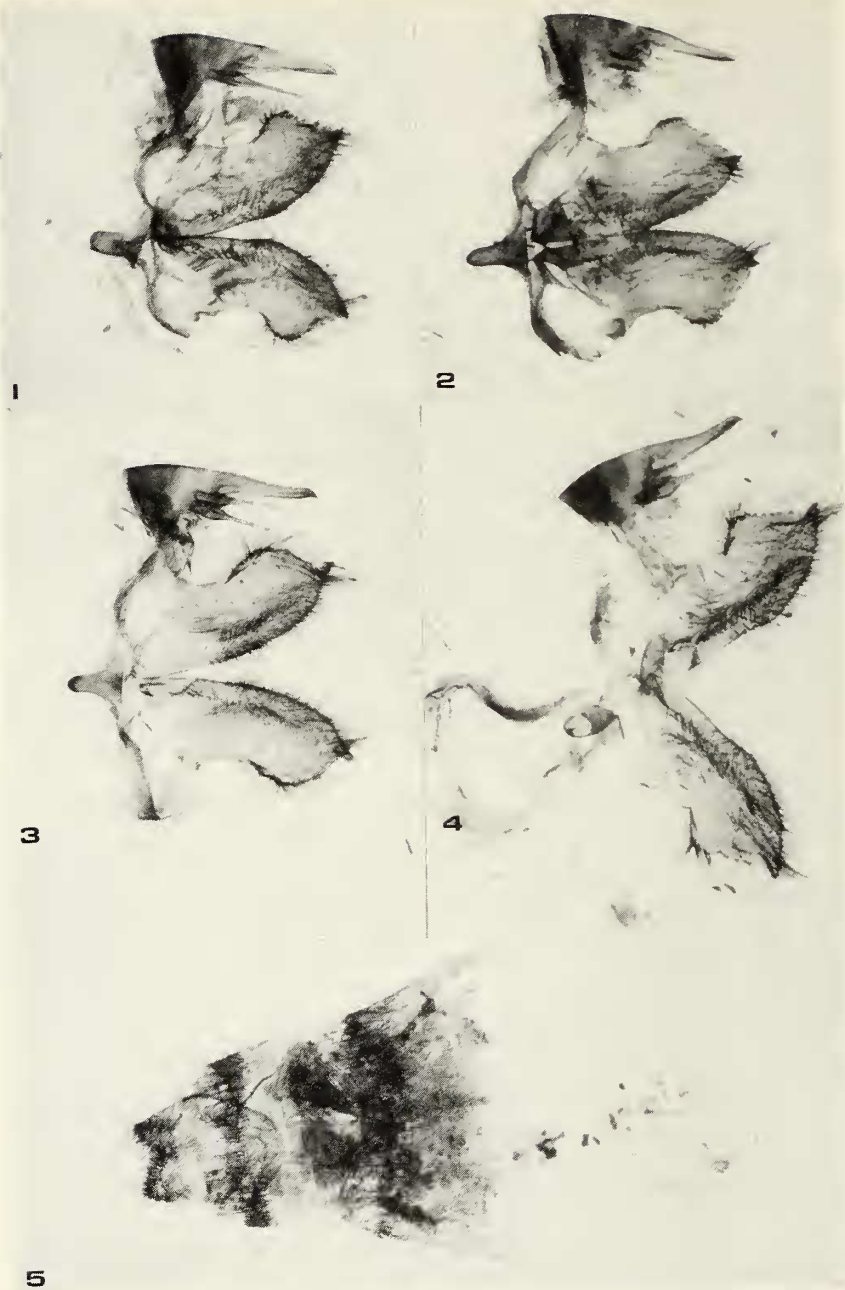


Figure 1 : 1-4 *Maniola chia* n. sp., Nea Moni, Chios, 30 May 1986 - male genitalia; 5 *Maniola chia* n. sp., female genitalia - data as male (magnification x10)

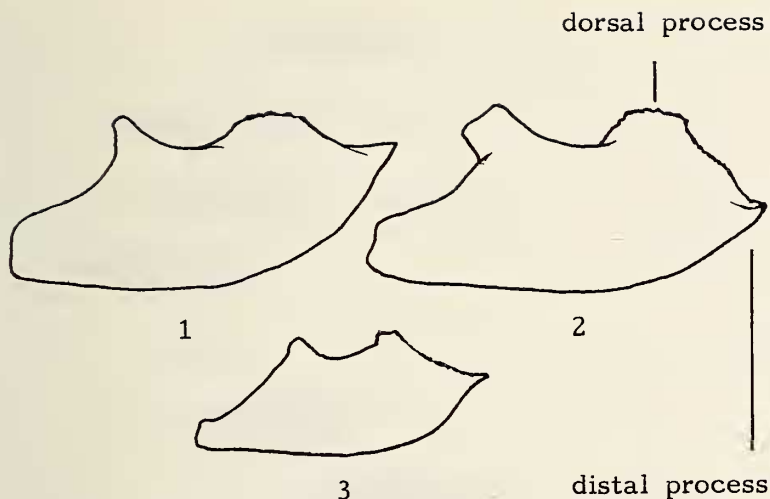


Figure 2 : Shape of typical male genital valves - 1 *Maniola jurtina* ('eastern' form, Istanbul, Turkey), 2 *Maniola chia* n.sp. and 3 *Maniola telmessia* (Samos, Greece).

#### First instar larva

Superficially similar to *telmessia*. Position of spines and setae identical with *telmessia*, but spine lengths differ markedly between the species.

#### Genetics

Allele frequencies suggest a relationship distinct from other *Maniola* species. A single monomorphic locus is fixed for a mobility different from that of both *jurtina* and *telmessia*. This dimeric locus is diagnostic for the *jurtina* and *telmessia* groups.

#### Variation

The range of variation in wing markings is similar to that in other *Maniola* species. Variation occurs principally in the size of the apical ocellus, the extent of fulvous on the upperside, the degree of melanism on the underside and the number and position of the underside hindwing ocelli. Three males and one female of a form homologous with form *addenda* MOUSLEY (THOMSON, 1969) of *M. jurtina* and three males with an ocellus on the upperside hindwing are included in the material studied. The range of variation in size is considerable, particularly in the males (figure 3).

#### Distribution and range

Known only from the island of Chios where it is, apparently, widespread and common, flying to at least 500 m.

#### Habitat

Flies in similar situations to *jurtina* and *telmessia* in south-eastern Europe, garigue, cultivated areas and less open habitat where the adults can find shade

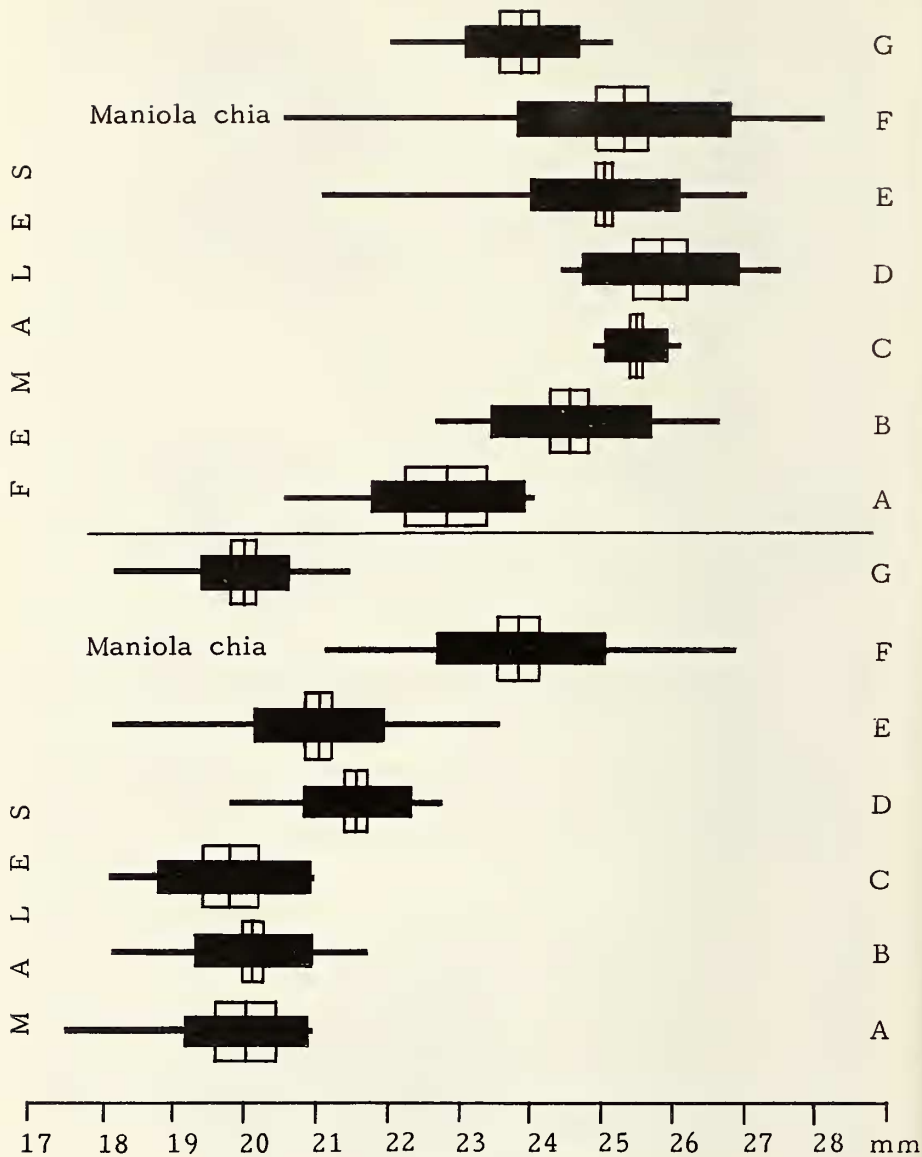


Figure 3 : Wing lengths of male and female *Maniola telmessia* and *M. chia* n.sp. from the Greek islands of Karpathos (A), Rhodes (B), Symi (C), Kos (D), Samos (E), Chios (F) and Lesbos (G); the thin line represents the range, the thick line 1 standard deviation each side of the mean and the open box 2 standard errors on each side of the mean.

including small pine woods with undergrowth and in particular near bushes especially *Quercus ilex* and *Rubus* sp. (OLIVIER, pers. comm.).

#### Flight

Earliest 23 May, latest 20 September. The adults are presumed to aestivate in the summer months like all southern *Maniola* species.

#### Types

Holotype male (figure 4, 1, 3): «Nea Moni (Hios, Griekenland) (500 m) / 30-V-1986 / coll. Alain OLIVIER» (Nea Moni, Chios, Greece, 500 m, 30 May 1986, leg. Alain OLIVIER), deposited in the Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, Amsterdam.

Allotype female (figure 4, 2, 4): «Nea Moni (Hios, Griekenland) (500 m) / 27-V-1986 / coll. Alain OLIVIER» (Nea Moni, Chios, Greece, 500 m, 27 May 1986, leg. Alain OLIVIER), deposited in the Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, Amsterdam.

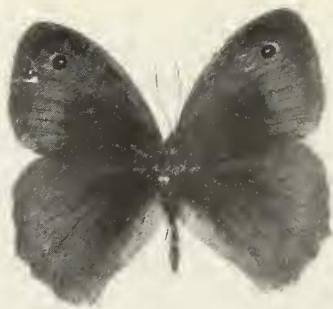
Paratypes : 11 males, 20 females deposited in the Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, Amsterdam, 28 males, 28 females (A. OLIVIER collection), 5 males, 5 females (author's collection), 1 male, 1 female (D. VAN DER POORTEN collection), 1 male, 1 female (J. DILS collection), 1 male, 1 female (A. RIEMIS collection), 1 male, 1 female (W.O. DE PRINS collection).

Material examined : 10 males, 26 May 1986, 5 km north-west of Chios, 300 m, leg. A. OLIVIER; 1 male, 28 May 1986, 5 km north-west of Chios, 300 m, leg. A. OLIVIER; 1 male, 29 May 1986, 5 km north-west of Chios, 300 m, leg. A. OLIVIER; 16 males, 11 females, 25 May 1986, Nea Moni, 500 m, leg. A. OLIVIER; 1 male, 26 May 1986, Nea Moni, 500 m, leg. A. OLIVIER; 8 males, 12 females, 27 May 1986, Nea Moni, 500 m, leg. A. OLIVIER; 16 males, 16 females, 30 May 1986, Nea Moni, 500 m, leg. A. OLIVIER; 5 males, 13 females, 30 May 1986, Nagos, 50 m, leg. A. OLIVIER; 12 females, 26 May 1986, 7 km north-west of Chios, 500 m, leg. A. OLIVIER; 1 female, 29 May 1986, 7 km north-west of Chios, 500 m, leg. A. OLIVIER; 3 males, 5 females, 23-28 May 1984, Kardamila, leg. D.E. GASKIN; 3 females, 16-20 September 1985, E. Marmaron, leg. D.E. GASKIN; 1 female, 28 May 1984, Marmaron, leg. D.E. GASKIN.

### Discussion

Chios is one of the large group of islands which lies a short distance from the Turkish mainland. On the other islands which have been studied, Karpathos, Rhodes, Symi, Kos, Samos and Lesbos, *telmessia* is the only *Maniola* which has been found. The wing length of male *Maniola chia* should distinguish it from most *telmessia* (figure 3). Female size overlaps with that of *telmessia* on the other islands in the eastern Aegean and dissection of genitalia is essential for identification.

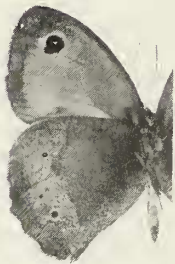
Although the large size of *chia* contrasts greatly with the small *telmessia* on



1



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3



4



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6



7



8



9



10

Figure 4 : *Maniola chia* n. sp. 1. holotype male; 2. allotype female; 3. holotype male (underside); 4. allotype female (underside); 5. male, Kardamila, Chios, 28 May 1984; 6. male, Nea Moni, Chios, 30 May 1986; 7. female, Nea Moni, Chios, 30 May 1986; 8. female, Marmaron, Chios, 28 May 1984; 9. female, Nea Moni, Chios, 27 May 1986; 10. female, E. Marmaron, Chios, 20 September 1985.



the adjacent islands, especially Lesbos, neither morphological nor electrophoretic data indicate character displacement. The affinities which this species displays with both *jurtina* and *telmessia* in the form of the genital armature and immature stages could suggest hybrid origin. However, electrophoretic analysis do not support this. It is likely that *Maniola chia*, an insular endemic species, is the consequence of founder effect during a period of rapid postglacial colonization, subsequent genetic drift and later consolidation by stabilising selection.

#### Acknowledgements

I am grateful to Professor David GASKIN for generously donating specimens and bringing this *Maniola* to my notice, A. OLIVIER for the supply of living material for electrophoresis and livestock as well as introducing me to the material in the Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, Amsterdam. Thanks are due to the curators of the Zoölogisch Museum, Amsterdam for allowing access to their collections. I must also thank H. VAN OORSCHOT, H. VAN DEN BRINK, W. DE PRINS and A. RIEMIS and other members of the Instituut voor Taxonomische Zoölogie for giving much of their time and commenting constructively on the manuscript.

The collection of material from the islands of Rhodes, Symi and Kos was supported by a grant from the Carnegie Trust for the Universities in Scotland.

#### Author's note

The analysis leading to the conclusions detailed in this paper form part of a major study of *Maniola* and related genera. It is not appropriate that details of electrophoretic techniques and analysis or larval chaetotaxy should be published here.

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## Boekbespreking

**Blab, J.** : *Grundlagen des Biotopschutzes für Tiere*

17 x 24 cm, 257 p., 78 figuren, 28 tabellen, Kilda-Verlag, Münsterstrasse 71, D-4402 Greven, 1986, gebonden in slappe kaft, DM 29,50 (ISBN 3-88949-115-4).

Dit is de tweede, sterk uitgebreide, uitgave van het boek dat voor het eerst in 1984 verscheen. Talrijke hoofdstukken werden bijgevoegd en de bestaande teksten werden alle sterk uitgebreid. Het boek valt uiteen in twee grote delen : het algemeen deel met gegevens over o.a. : indeling van biotopen, waardering van verschillende ecosystemen, en het gedetailleerde deel waarin achtereenvolgens de verschillende biotopen worden besproken waarin dieren leven, o.a. : binnenwaters, moerassen, graslanden, bossen, akkers. Bij elk biotooptype worden karakteristieke soorten opgenoemd en de eisen besproken die ze aan hun milieu stellen. Die voorbeeldsoorten worden voornamelijk gekozen bij de gewervelde dieren, de vlinders, kevers, libellen, vliesvleugeligen, sprinkhanen en slakken. Tevens worden bij elk biotooptype de factoren besproken die er de oorzaak van zijn dat het biotoop devalueert en de maatregelen die dienen genomen te worden om de achteruitgang te stoppen en de oorspronkelijke toestand te herstellen.

Het boek is zeer gedetailleerd onderverdeeld in hoofdstukken, paragrafen enz. Alleen hierdoor was het mogelijk om enige klaarheid te scheppen in deze onoverzichtelijke materie. Belangrijk is het besluit van de auteur dat het beschermen van soorten (door b.v. vangverbod) alleen zin heeft als eerst het voortbestaan van hun biotopen verzekerd is. Omdat het boek zo sterk onderverdeeld is en erg op de praktijk gericht, vindt eenieder in enkele ogenblikken de informatie die hij zoekt. Het boek mag dan ook niet in de boekenkast ontbreken van diegenen die zich met natuurbescherming bezighouden, hetzij omwille van hun beroep of omwille van persoonlijke interesse.

W.O. De Prins